

CLAIMS:

1. A method of processing seismic data, the data being in the frequency-space domain, the method comprising:
 - determining a prediction filter from the seismic data at a first frequency at which swell noise is not present; and
 - applying the prediction filter to seismic data at a second frequency at which swell noise is present, thereby to attenuate swell noise in the seismic data at the second frequency.
2. A method as claimed in claim 1 and further comprising the steps of:
 - determining a prediction filter from the seismic data at a third frequency at which swell noise is not present, the third frequency not being equal to the first frequency; and
 - applying the prediction filter to seismic data at a fourth frequency at which swell noise is present, the fourth frequency not being equal to the second frequency, thereby to attenuate swell noise in the seismic data at the fourth frequency.
3. A method as claimed in claim 2 wherein the difference between the first frequency and the second frequency is equal to the difference between the third frequency and the fourth frequency.
4. A method as claimed in claim 1, 2 or 3 and comprising, for each frequency in the range for which swell noise is present in the seismic data, determining an associated prediction filter from the seismic data at a frequency at which swell noise is not present.
5. A method as claimed in claim 4 wherein the frequency range for which swell noise is present in the seismic data extends from a frequency f_L to a frequency f_H , and the associated prediction filter for frequency f_i is determined from seismic data at a frequency $f_{i-L+H+1}$.

6. A method of marine seismic surveying comprising actuating a source to emit acoustic energy; acquiring seismic data in the frequency-space domain; and processing the data according to a method as defined in any preceding claim.
7. A method as claimed in claim 6 wherein the step of acquiring seismic data in the frequency-space domain comprises acquiring seismic data in the time domain and transforming the data to the frequency-space domain.
8. A method as claimed in any preceding claim and comprising the further step of transforming the processed data to the time domain.
9. An apparatus for processing seismic data, the data being in the frequency-space domain, the apparatus comprising:
 - means for determining a prediction filter from the seismic data at a first frequency at which swell noise is not present; and
 - means for applying the prediction filter to seismic data at a second frequency at which swell noise is present, thereby to attenuate swell noise in the seismic data at the second frequency.
10. An apparatus as claimed in claim 9 and further comprising:
 - means for determining a prediction filter from the seismic data at a third frequency at which swell noise is not present, the third frequency not being equal to the first frequency; and
 - means for applying the prediction filter to seismic data at a fourth frequency at which swell noise is present, the fourth frequency not being equal to the second frequency, thereby to attenuate swell noise in the seismic data at the fourth frequency.
11. An apparatus as claimed in claim 9 or 10 and adapted to determine, for each frequency in the range for which swell noise is present in the seismic data, an associated prediction filter from the seismic data at a frequency at which swell noise is not present.

12. An apparatus as claimed in claim 11 wherein the frequency range for which swell noise is present in the seismic data extends from a frequency f_L to a frequency f_H , and the apparatus determines, in use, an associated prediction filter for frequency f_i from seismic data at a frequency $f_{i-L+H+1}$.
13. An apparatus as claimed in any of claims 9 to 12 and comprising a programmable data processor.
14. A seismic surveying arrangement comprising: a source of acoustic energy; means for acquiring seismic data in the frequency-space domain; and an apparatus as defined in any of claims 9 to 13.
15. A seismic surveying arrangement as claimed in claim 14 wherein the means for acquiring seismic data in the frequency-space domain comprises one or more receivers for acquiring seismic data in the time domain and transform means for transforming the data to the frequency-space domain.
16. A storage medium comprising a program for a data processor of an apparatus as defined in claim 13.
17. A storage medium containing a program for controlling a data processor to perform a method as defined in any of claim 1 to 5.